



# Human Systems integration division



## Perceptual and Behavioral Adaptation Group

### Overview

Perceptual illusions and degraded psychomotor performance result during and after exposure to the unusual gravitational-inertial conditions encountered in space flight. Because these illusions and disruptions of behavior can compromise safety, and because they are important both theoretically and practically, we are attempting to enhance our understanding of them.

The perceived location of visual targets depends on both retinal and extra-retinal information. Both retinal stimulation and stimulation of the vestibular organs affect oculomotor control, which in turn, influences perception and spatially-directed behavior. Although quantitative relationships among these variables can be determined under specific conditions, the relationships are adaptive, in that the organism can learn to extract meaning under conditions in which it is given an opportunity to interact with the environment. These adaptive processes are such that the organism can learn to function appropriately in an environment in which it did not originally develop or evolve.

The studies all involve the systematic alteration of the visual and/or the gravitational-inertial field in which human subjects perform. Centrifugation, water immersion (simulated microgravity), and altered visual stimuli are used to determine how human oculomotor control, perception, and perceptual-motor behavior depend on these aspects of the environment, to delineate the range over which normal functioning remains unaffected by these parameters, and to develop quantitative models that describe and predict how oculomotor control, perception and perceptual-motor behavior are altered by systematic changes of the environment.

URL: <http://pbagroup.arc.nasa.gov>

